S133

8/23/63

Ham well Info
Feb 1969

WELL REPORT

HAMMERMILL #1

DISPOSAL WELL

Rec'd 23 AUG 63
APPROX. 65 pp.

for

HAMMERMILL PAPER COMPANY

ERIE, PENNSYLVANIA

DOW INDUSTRIAL SERVICE DOW Division of THE DOW CHEMICAL COMPANY

July 29, 1963

Copy No. 10

This copy of the report by Dow Industrial Service to Hammermill Paper Company on Hammermill No. 1 Disposal Well does not contain the section entitled Recommendations, pages 5 and 6. This section was omitted because it does not contain any information pertinent to the drilling and performance of Hammermill No. 1 Disposal Well.

A string of 4-1/2" O.D. 9.5# API, J55, 8RT injection tubing (epoxy lined) was run on March 28, 1963, after the report was submitted.

A total of fifty (50) joints were run, having a total length of 1620.69 feet. This tubing was set at a depth of 1619.44 feet (reference elevation is top of collar of 9-5/8" casing). The tubing head and valve was placed on the well and the well left shut-in.

D. T. Jackson/ga

TABLE OF CONTENTS

SUMMARY

The Hammermill #1 well at Erie, Pennsylvania has been drilled, completed and tested according to plan. The well was drilled to a total depth of 2302 feet and both the Lockport and Bass Island formations tested as agreed under terms of the contract and P. O. #78075.

Conditions encountered during drilling and completion of the well were generally as expected. Formations were topped at the anticipated elevations, salt water flows in the volumes and from the elevations expected were consistent with the plan and no significant mechanical or hydraulic difficulties were encountered during the operation.

Certain developments were unexpected. These had the over-all result of increasing injection pressures and reducing injection volume.

The first unexpected condition became evident when the formation bottom hole pressure was higher than anticipated. This increase in pressure resulted in a hydraulic gradient of approximately

Summary - continued

.532 pounds per square inch per foot of depth instead of .277 pounds per square inch per foot of depth. This effect was to increase bottom hole pressure by some 406 pounds per square inch over that expected. Estimated surface injection pressure at 350 gallons per minute was 300 pounds per square inch. During an injection test at the same volume the surface pressure was 900 pounds per square inch. Bottom hole injection pressure, therefore, at this volume actually was approximately 600 pounds per square inch over the estimated figure. All except 194 pounds per square inch of the pressure error was due to the abnormally and unexpectedly high bottom hole pressure.

Another unexpected result was the low permeability encountered in the Lockport dolomite. This formation had such low permeability it was not possible to successfully acidize it. Two attempts were made to acidize the formation and in neither case did the acid enter the formation matrix, as desired, to increase its permeability.

The Bass Island formation was successfully acidized and tested.

Summary - continued

Permeability of the section tested has been calculated to be 2300 millidarcies. Acidizing was conducted at the rate of 800 gallons per minute with a surface injection pressure of 1100# (friction losses were negligible). Injection tests indicated that initial injection may be conducted at the rate of 650 gallons per minute at 1350 pounds per square inch and 350 gallons per minute at 900 pounds per squnre inch. The estimate is that after one year's injection at the rate of 350 gallons per minute surface injection pressures will, due to pressure loading of the formation, increase to 1100#. The annual increases thereafter will be progressively less.

Approximately 50' of indicated permeability was logged in the Lockport where 70' was expected. 30' was expected in the Bass Island; total permeable section logged was 50' which was successfully perforated, acidized and tested.

CONCLUSIONS

From the above two conclusions may be drawn: (1) the Lockport was not properly evaluated and must be considered at this time to be too tight for injection purposes; (2) the Bass Island may be suitable for injection purposes but pressures will be higher than anticipated and will require the use of positive displacement pumps rather than centrifugal pumps as previously considered.

WELL HISTORY

Commenced drilling operations on January 24, 1963 when 40 feet of 13-3/8 inch, 48 pound, H-40 conductor pipe were set without cement. Drilling was continued, using an 11-3/4 inch bit, until February 8, 1963 when 1359.42 feet of 9-5/8 inch, 36 pound, J-55 casing was set and the 9-5/8 inch casing was cemented to the surface. Very slight gas shows were encountered at 150 feet and at 350 feet in depth.

After waiting 36 hours for cement to set, the casing was pressure tested on February 11, 1963 to 1,000 psig satisfactorily and drilling was continued with an 8½ inch hole to 1690 feet on February 18, 1963. Water was encountered by driller at 1631 to 1651 feet in the Bass Island. At 1690 feet Spinner Survey #1 was run. This survey found the most permeable section to be from 1574 to 1598 feet, covering a slight gas show in sand by the driller from 1579 to 1589 feet.

Continued drilling 8½ inch hole to 2110 feet where on February 25, 1963 a Gamma Ray, Guard, Sonic and collar logs were run from

Well History, continued

1100 to 2110 feet. A string of 7 inch, 23 pound, J-55 casing was then run to 2106 feet using a float shoe, collar and centralizers. This casing was cemented with 175 sacks of portland cement giving a calculated fill-up to 879 feet from surface or 480 feet into the 9-5/8 inch casing.

On February 27, 1963 a temperature survey was run to check the top of the cement, finding the top of the cement at 880 feet from surface. Drilling was continued using a 6¼ inch bit until March 6, 1963 when a total depth of 2302 feet was reached. Water zones were encountered at 2206 to 2215 feet and 2235 to 2245 feet in the Lockport. While drilling from 2206 feet to total depth of 2302 feet, water stood in hole at varying depths of 900 to 150 feet from surface.

On March 6, 1963 ran a Gamma log (attempted to run other logs but were unable to do so because of shorts in the cable). Followed logs with Spinner Survey #2 of the Lockport formation. Water was found to be going in from 2234 to 2270 feet. The test was run at one barrel per minute at 2200 psig.

Well History - continued

An attempt was made to acidize the Lockport formation. Nine thousand gallons were used at approximately 2500 psig with no indications of positive results.

On March 7, 1963 Spinner Survey #3 was run in the Lockport formation. Water was found to be going around 7 inch casing shoe behind casing at 2108 feet. Guard and velocity logs were run (logs which were not obtained before because of a short in the cable) of the Lockport formation. The logs were from 2100 to 2302 feet. The Lockport formation was then open hole perforated from 2207 to 2257 using shape charges (3 per foot).

On March 8, 1963 the Lockport formation was covered with pea gravel and sand to protect the formation. The hole was filled to a depth of 2112 feet. An attempt was made to cement around the 7 inch casing shoe at 2106 feet with 100 sacks of cement. This attempt failed when the cementing head split while attempting to release follow-up plug. Cement was flowed to surface.

On March 9, 1963 the job of cementing around the 7 inch casing

Well History - continued

shoe at 2106 feet was successfully completed using 100 sacks of portland cement with 1½% chlorides. The cement was stage squeezed in three stages starting at 1400 psig and ending at 2300 psig with the top of the cement left at 2096 feet.

After allowing the cement to set for 48 hours, it was drilled to 2107 feet (shoe at 2106 feet) on March 11, 1963. A sand bridge was kicked up the hole while drilling at 2107 feet. Bridge was encountered from 2050 to 2080 feet. Bailed and drilled down (5 bailers of water). Hole empty to 2115 feet where sand again encountered. Continued cleaning out hole with Lockport (black water) standing 150 feet from surface.

On March 12, 1963 cleaned out to 2270 feet. Ran 2 inch tubing to 2264 feet.

March 13, 1963 an attempt was made to acidize the Lockport formation. Hole was circulated clean, acid spotted on the formation. Maximum rate of 1½ barrels per minute was obtained at 1700 psig. No indication of positive results obtained. Ten

Well History - continued

thousand gallons of acid were used. Filled well with water and tubing was pulled. A bridge plug (Baker, cast iron) was set at 1710 feet in the 7 inch casing. The Bass Island formation was perforated through the casing from 1620 to 1670 feet with shape charges, three shots per foot. An attempt was made to run a Spinner Survey prior to acidizing but formation would not take fluid at 2500 psig.

On March 14, 1963 the Bass Island formation (perforations 1620 to 1670 feet) was acidized. The formation started taking acid at 1400 psig at a rate of 4 barrels per minute. Rate gradually increased to 19 barrels per minute while pressure increased to 1300 psig. Pressure gradually decreased to 1100 psig while pumping acid at rate of 19 barrels per minute. Used total of 34,000 gallons of acid on this formation. Pressure and rate were remaining constant at the end of the job.

Spinner test #4 and pump tests were performed on the Bass Island formation on March 15, 1963. Spinner test #4 indicated formation taking fluid from 1620 to 1654 feet. Pumped at varying

Well History - continued

rates from 7 barrels per minute to 16½ barrels per minute and pressures from 850 psig to 1350 psig (see injection test graph). Pressure bled to 1,000 psig immediately, to 850 psig in thirty minutes and 775 psig in one hour. The well was left shut in since 4½ inch injection tubing was not available from the mill.

DWL-4

DOWELL

( ) JOB NO.

CEMENTING SERVICE REPORT

1-16-1134

DISTRICT Evansville - 01 STATION Pennsylvania - 55 DATE 2-2-63

OWNER Dow Industrial CONTRACTOR Plankton Bros. WELL NAME Kenner Hill NO. 1

POOL - LOCATION Erie Twp. COUNTY Erie STATE Penna.

TYPE OF JOB: Cement Intermediate String

USED FOLLOWING: MEASURING LINE no DISPLACEMENT yes TOP PLUG yes BOTTOM PLUG no

CEMENTING HEAD yes FLOAT EQUIPMENT yes DISC no RETAINER no

WELL DATA

ROTARY - WT. DRILLING MUD - VISCOSITY - CABLE TOOL yes

SIZE HOLE 11 3/4 TOTAL DEPTH 1383 BRADENHEAD -

CASING SIZE 9 5/8 WT. 36 DEPTH 1363 CONDITION new THREAD 8rd

SURFACE OR CONDUCTOR CASING SIZE 13 WT. - DEPTH 40 CONDITION new

LINER SIZE - WT. - TOP - BOTTOM - CONDITION - TYPE -

TUBING OR DRILL PIPE SIZE - WT. - DEPTH - CONDITION -

RETAINER TYPE - DEPTH - TAILPIPE - DEPTH -

PREVIOUS CEMENT JOB: DATE - KIND - SERVICE CO. - JOB NO. -

DETAILED RECORD OF SERVICE

TIME	PRESSURE	DETAIL
1300		ARRIVED ON LOCATION
1445		Hooked up to well, begin break circulation
1502		Have circulation, prepare mix cement
1512		50-50 Litepoz mixed, switch to Portland
1513		Shut down, chain jumped off bulk truck conveyor
1520		Begin mix Portland
1540		Cement mixed and in csg., prepare to release plug
1558		Plug in place, lines flushed, begin displacement
1621		Plug on seat and holding
1630		LEFT LOCATION

DEPTH STOP PLUG 1363 LEAVING 0 CEMENT IN PIPE

WAS CIRCULATION EVER LOST no WAS CEMENT CIRCULATED TO SURFACE yes

REMARKS -

MATERIALS USED

FURNISHED BY CUSTOMER: SACKS CEMENT - KIND CEMENT - WT. SLURRY -

PERCENT BENTONITE - PERCENT CACL - SACKS MUD -

OTHER MATERIALS -

FURNISHED BY DOWELL: SACKS CEMENT 290 KIND CEMENT Portland WT. SLURRY 12.5 & 15.5

PERCENT BENTONITE - PERCENT CACL 1% SACKS MUD -

OTHER MATERIALS 114 cu. ft. Litepoz II

PERSONNEL AND EQUIPMENT USED

	EMPLOYEE	TRUCK-CAR	
CEMENTER	Bright	1962-55	B. L. Bright, CEMENTING ENGINEER
EQUIPMENT OPERATOR	Crossmun	37-6476	
EQUIPMENT OPERATOR	Lingenfelter	40-6002	Canton 31-5677

ROUND TRIP MILES, STATION TO WELL 250

DISTRICT MANAGER OR STATION MANAGER

COPIES TO ☐ GENERAL OFFICE ☐ DISTRICT ☐ STATION ☐ CUSTOMER

AR101895

TREATMENT REPORT

DOWELL DIVISION OF THE DOW CHEMICAL COMPANY

DATE	2-21-63
WELL NAME AND NUMBER	Hammer Mill #1
LOCATION	Erie Twp.
CUSTOMER REPRESENTATIVE	Mr. Paul Reardon
TREATMENT NUMBER	1-14-1138
FORMATION	Niagara
JOB DONE DOWN	Tubing A ☐ Casing B ☐ Annulus C ☐
ALLOWABLE PRESSURE	Tbg. - Csg. 1000
COUNTY	Erie
STATE	Pennsylvania
TYPE OF WELL	Oil A ☐ Gas B ☐ Water C ☐ Disposal D ☒
TYPE OF SERVICE	Pump Rental
AGE OF WELL	New Well A ☒ Rework B ☐
TOTAL DEPTH	1335
CIRC. RHT.	-
CUST. NAME	New Industrial Service
CASING SIZE	9 5/8
CASING DEPTH	1315
TUBING SIZE	-
TUBING DEPTH	-
ADDRESS	20575 Center Ridge Rd.
LINER SIZE	-
LINER DEPTH	-
PACKER TYPE	-
PACKER DEPTH	-
OPEN HOLE	-
CSG. OR ANNL. VOL.	105
TBG VOLUME	-
STATIC RHT.	-
CITY AND STATE	Cleveland 16, Ohio

PERFORATED INTERVALS

DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES

REMARKS:

Testing pipe after cement service w/1 TP

FOR CONVERSION PURPOSES 24 BBLS EQUALS 1000 GALLONS

ARRIVED ON LOCATION: 1000

TIME	INJECTION RATE	INJECTION BBLS IN	PRESSURE	PRESSURE Csg.	SERVICE LIQUID (A)	SERVICE PURPOSE	FLA (B) CONC.	(C) PROPPING AGENT OR (D) PLUGGING SERVICE TYPE	SIZE	CONC.	AMOUNT
1200		1		1000	FW	Test pipe					
1240		1		1000	FW	Test pipe					
						Pressure holding steady					
						Job complete					

TIME LEFT LOCATION: 1500	AVER. LIQUID INJ. RATE: -	ADJ. INJ. RATE (SOLIDS INC.):
MAX. PRESSURE: 1000	AVER. PRESSURE: 1000	SHUT IN PRESSURE: IMMEDIATE - ; MINUTE -
DOWELL LOCATION: Punxsutawney - 55	DOWELL ENGINEER: B. L. Bright	

PROPS AND LIQUIDS INJECTED

TYPE	SIZE OR PURPOSE	AMOUNT

NOTE: SEE (AA) FOR SPECIAL ADDITIVES

MA—MUD ACID
X—HCL ACID
APF—ACID PETROFRAC
FA—FRAC ACID
BDA—BREAKDOWN ACID
LO—LEASE OIL
RO—REFINED OIL
DO—DIESEL OIL
KE—KEROSENE
PJ—PETROJEL
PF—PETROFRAC
FW—FRESH WATER
BR—BRINE
WF—WATERFRAC
M41—M41 GEL
ST—STRATAFRAC
VR—VERSENE
SSS—TRIPLE S ACID
SLW—SLICK WATER
SLO—SLICK OIL
MUD—DRILLING MUD
RX1—RETARDED ACID I
RX2—RETARDED ACID II
RX3—RETARDED ACID III

(AA) ADDITIVES IN FLUID (EXCEPT FLA*)
CONC. IS GIVEN IN LBS. OR GALS. PER 1000 GALS. OF TOTAL GALS.

TYPE	TREATED	CONC.

(B) CONC. IS GIVEN IN LBS. OR GALS. PER 1000 GALS. OF LIQUID
J97—DOWELL J97
J101—DOWELL J101
J84—DOWELL J84
J98—DOWELL J98
J99—DOWELL J99

(C) SIZE IS GIVEN IN MESH RANGE CONC. IS GIVEN IN LBS. PER GALLON OF LIQUID
S—SAND
WS—WALNUT SHELLS
AL—ALUMINUM
NY—NYLON

(D)
FF—XA30 FIXAFRAC
KJ—XA20 GEL
DO—GELLED OIL
DW—GELLED WATER
RB—RUBBER BALLS
NCB—NYLON CORE BALLS
PB—PERMEABLE BALLS
MB—MOTH BALLS
RS—ROCK SALT
OS—OYSTER SHELLS

AR101896

TREATMENT REPORT
DWL-496-P PRINTED IN U.S.A.

WELL DIVISION OF THE DOW CHEMICAL COMPANY

DATE: 2-10-63

WELL NAME AND NUMBER	LOCATION	CUSTOMER REPRESENTATIVE	TREATMENT NUMBER
Hammermill #1	Erie Twp.	Mr. Paul Reardon	1-16-1145
	FORMATION: Bass Island	JOB DONE DOWN: TUBING A ☐ CASING B ☐ ANNULUS C ☐	ALLOWABLE PRESSURE: TBG: CSG.
COUNTY: Erie	STATE: Pennsylvania	TYPE OF WELL: OIL A ☐ GAS B ☐ WATER C ☐ Disposal D ☒	
TYPE OF SERVICE: Pump Rental		AGE OF WELL: NEW WELL A ☒ REWORK B ☐	TOTAL DEPTH: 1690

CUST. NAME: Dow Industrial Service

ADDRESS: 20575 Center Ridge Road

CITY AND STATE: Cleveland 16, Ohio

REMARKS: Pumping down 9 5/8" csg. while spinner survey is being run
1 T.P.

FOR CONVERSION PURPOSES 24 BBLS EQUALS 1000 GALLONS

ARRIVED ON LOCATION: 1330

8 CASING SIZE	9 CASING DEPTH	10 TUBING SIZE	11 TUBING DEPTH
9 5/8	1359	--	--
12 LINER SIZE	**13 LINER DEPTH**	**14 PACKER TYPE**	**15 PACKER DEPTH**
--	--	--	--
16 OPEN HOLE	**17 CSG. OR ANNL. VOL.**	**18 TBG VOLUME**	**19 STATIC BHT.**
331		--	--

PERFORATED INTERVALS

DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES	DEPTH	NO. OF HOLES

TIME	INJECTION RATE	INJECTION BBLS IN	PRESSURE Csg.	SERVICE: LIQUID (A)	SERVICE: PURPOSE	SERVICE: F/A (B) CONC.	(C) PROPPING AGENT OR (D) PLUGGING SERVICE: TYPE	SIZE	CONC.	AMOUNT
1430					Hooked up as far as rig floor, waiting for TD to be reached					
1700		63		FW	Load hole					
1705		63	1400	FW	Press. test lines					
1710		65	1400	FW	Begin pumping into formation					
1712	1/4	68	950	FW	Start survey					
1810	1/4	155	1100		Survey complete					

TIME LEFT LOCATION	LAYER, LIQUID INJ. RATE	ADJ. INJ. RATE (SOLIDS INCL.)	PROPS AND LIQUIDS INJECTED: TYPE	SIZE OR PURPOSE	AMOUNT
1930	1/4	-			
MAX. PRESSURE: 1400	LAYER, PRESSURE: -	SHUT IN PRESSURE: IMMEDIATE 1060 / 15 MINUTE -			
DOWELL LOCATION: Punxsutawney - 55	DOWELL ENGINEER: D. L. Bright				

(B) SEE (AA) FOR SPECIAL ADDITIVES

MA—MUD ACID
A—HCL ACID
APF—ACID PETROFRAC
FA—FRAC ACID
BDA—BREAKDOWN ACID
LO—LEASE OIL
PO—REFINED OIL
DO—DIESEL OIL
KE—KEROSENE
PI—PETROJEL
PF—PETROFRAC
FW—FRESH WATER
WF—WATERFRAC
AH—AH-1 GEL
ST—STRATAFRAC
VR—VERSENE
SS—TRIPLE S ACID
SLW—SLICK WATER
SLO—SLICK OIL
MUD—DRILLING MUD
RXI—RETARDED ACID I
RX2—RETARDED ACID II
RX3—RETARDED ACID III

(AA) ADDITIVES IN LIQUID (EXCEPT FLA*)
CONC IS GIVEN IN LBS. OR GALS. PER 1000 GALS. OF TOTAL GALS.

TYPE	TREATED	CONC.

(BB) CONC. IS GIVEN IN LBS OR GALS. PER 1000 GALS. OF LIQUID
197—DOWELL 197
J101—DOWELL J101
J18—DOWELL J14
J44—DOWELL J44
J99—DOWELL J99

AR101897

(C) SIZE IS GIVEN IN MESH RANGE CONC. IS GIVEN IN LBS. PER GALLON OF LIQUID
S—SAND
WS—WALNUT SHELLS
AL—ALUMINUM
NY—NYLON

(D)
FF—X630 FIXAFRAC
KI—X810 GEL
DO—GELLED OIL
DW—GELLED WATER
RU—RUBBER BALLS
NCB—NYLON CORE BALLS
PB—PERMEABLE BALLS
MB—MOTH BALLS
RS—ROCK SALT
OS—OYSTER SHELLS